Rombough, Kyrik

From: Colin Campbell [campbell@rtpenv.com]
Sent: Thursday, August 28, 2008 10:53 PM
To: Rombough, Kyrik
Subject: RE: Hyperion air permit application - supplemental information


1A-14192 - /ised Tank Farm 1B-14192 rev Revised Tank.

Mr. Rombough,

As we discussed, I am providing a partial response today. We will provide the additional data that you have requested as soon as the data can be assembled.

A1. As shown in Appendix C to the permit application, the maximum expected emissions from the coker charge (i.e., vacuum residuum) tanks are 9.25 tons per year. This value reflects the use of an exhaust gas cooling and filtration system, proposed as BACT and discussed in Section 4.7.2 of the permit application, to achieve 90 percent reduction in emissions. As discussed briefly in Section 4.7.2, it is theoretically possible to maintain the displaced vapors from these tanks at elevated temperatures such that the emissions could be controlled using thermal oxidation. Under this scenario, the cooling and filtration system would not be used, and the emissions routed to the thermal oxidizer would be an uncontrolled emission rate of 92.5 tons per year. Assuming 98 percent control efficiency, the thermal oxidizer would reduce these emissions from the coker charge tanks by 90.7 tons per year. As shown in Appendix D to the initial permit application, the tank farm thermal oxidizer under "Case 1" could achieve a total VOC emission reduction of 231.3 tons per year. The emissions from the coker charge tanks represent a significant fraction (approximately 39 percent) of this total. In contrast, in the additional information that I provided to you yesterday, the tank farm thermal oxidizer evaluated in "Case 1" was designed to serve only 89 tanks that were proposed to be configured with an internal floating roof design. The coker charge tanks were not included in the evaluation that was documented in yesterday's submittal.

A2. The total capital cost of the closed vent system and thermal oxidizer, as presented in Appendix D to the initial permit application, was based on a capital cost value provided to RTP by Mustang Engineers & Constructors, LP, the design engineers for the HEC. This cost was increased by a factor of two by RTP in order to reflect a total installed cost. The revised capital cost estimate provided yesterday, for a redesigned system, reflects the value provided by Mustang. The latter value represents the total installed cost and no factor was applied by RTP.

A3. The flow rates in each case were developed by Mustang as part of their design of the closed vent system(s) and thermal oxidizer(s). The rates are different for two general reasons. First, the system evaluated in the initial permit application was larger in scope, controlling 104 tanks as compared to a total 89 tanks in the systems that were evaluated and documented in yesterday's submittal. Second, for the systems evaluated and documented in yesterday's submittal, the design flow rates are larger on a per-tank basis. This reflects refinement of Mustang's system design, including measures taken to minimize back-pressure on the atmospheric storage tanks; a sweep gas system to avoid tank cross-contamination issues; and flow due to standing losses as well as withdrawal losses.

B1. The summaries provided to RTP by Mustang regarding Mustang's capital cost estimates are attached. Please let me know if you need additional supporting information.

B2 and B3. I understand that you requested capital cost documentation for internal floating roofs and emissions data for alternative tank configurations for the purpose of determining total cost effectiveness values in addition to the incremental cost effectiveness data that we have already provided. I propose to develop these data only for tanks storing kerosene/jet fuel or heavier material. For tanks storing gasoline and other volatile materials, floating roofs are inherent process equipment that are appropriately considered in determining baseline emissions and total cost effectiveness in a BACT economic impacts analysis. U.S. EPA policy indicates that the baseline emissions

rate should be a realistic assessment of upper bound uncontrolled emissions; assuming the use of a fixed roof tank to store gasoline and similar liquids is not realistic, because floating roofs are an economic necessity in order to minimize the loss of valuable product. To illustrate: For a gasoline storage tank with a diameter of 173 feet, the cost of an internal floating roof tank exceeds the cost of a comparable fixed roof tank by approximately $1.2 million. Assuming a capital recovery factor of 10% and ignoring any operating costs, this represents an annual cost of $120,000. In an internal floating roof configuration, this tank emits approximately 1.8 tons of VOC per year, which equates to the loss of 580 gallons of liquid gasoline product per year. In a fixed roof configuration, this tank would emit 950 tons of VOC per year, which equates to the loss of 300,000 gallons of liquid gasoline product per year. Provided that the value of gasoline is at least $0.39 per gallon, the value of product retention exceeds the cost of installing and operating an internal floating roof. Based on this information, I request your concurrence with my proposal to provide this cost and emissions information only for tanks storing kerosene/jet fuel or heavier material.

Thank you for your assistance.

Colin Campbell

-----Original Message-----
From: Kyrik.Rombough@state.sd.us [mailto:Kyrik.Rombough@state.sd.us]
Sent: Thursday, August 28, 2008 4:52 PM
To: campbell@rtpenv.com
Subject: RE: Hyperion air permit application - supplemental information

Mr. Campbell:

Thank you for the additional information on the storage tanks and the costs for the thermal oxidizer.

Please clarify the following differences between the cost analysis submitted with the application and the updated cost analysis:
1) The 90 tons of volatile organic compounds emissions associated with vacuum residuum tanks;
2) The capital cost equation(s) in the two spreadsheets; and
3) The estimated flow rates in the two spreadsheets

In addition, please provide the following information:
1) Supporting documentation for the capital cost used in the cost analysis for the tank farm thermal oxidizer(s) and ancillary equipment, including equipment cost, installation cost, etc.;
2) Documentation for the capital cost for the floating roofs associated for each tank within the tank farm; and
3) An estimate of the volatile organic compound emissions from each tank within the tank farm without the use of any control measures such as the floating roofs, vapor recovery system, etc.

If you have any questions with my request, please let me know. Thank you for your prompt attention to this request.

Kyrik

Kyrik Rombough
Natural Resources Engineering Director
Air Quality Program
Phone: 605-773-3151
Email: Kyrik.Rombough@state.sd.us
Fax: 605-773-5286

-----Original Message-----
From: Colin Campbell [mailto:campbell@rtpenv.com]
Sent: Wednesday, August 27, 2008 1:27 PM
To: Rombough, Kyrik
Subject: Hyperion air permit application - supplemental information

Mr. Rombough,

This email message presents additional information supplementing our PSD permit application submitted on December 20, 2007. This supplemental information is being provided as a follow-up to our discussion regarding the BACT analysis for VOC emissions from storage tanks during our meeting in Pierre on July 14-15, 2008. Specifically, we are proposing a revised air pollution control configuration for six gasoline storage tanks, and we are providing supplemental information supporting our proposed BACT determinations for several other tanks.

As you know, in Section 4.7.1 of our permit application, we proposed to use an internal floating roof design as BACT for 95 organic liquid storage tanks and to use a fixed roof, with no additional air pollution controls, as BACT for the VOC emissions from the remaining 9 organic liquid storage tanks. In Section 4.7.1.5.2 of the permit application, we evaluated a control option that would involve using a thermal oxidizer to control VOC emissions from all 104 of these tanks (i.e., 95 tanks would be controlled using both an internal floating roof and a closed vent system routed to a thermal oxidizer, and 9 would be controlled using only a closed vent system routed to a thermal oxidizer.) We explained that this control option would result in adverse energy and environmental impacts, due to the auxiliary fuel needs for the thermal oxidizer and electrical power needed to induce the flow of tank exhaust gases through the thermal oxidizer without exerting excessive pressure on the storage tanks, and would also result in significant, adverse economic impacts. We proposed that this option be rejected as BACT for these reasons.

Six of the storage tanks that were proposed to be configured as internal floating roof storage tanks are the gasoline product day tanks located at the product loading racks (Tank ID numbers SS14-1 through SS19-1). For these six tanks, we have further evaluated VOC control options, and have concluded that emissions can be controlled to a greater degree using the vacuum-regenerated, carbon adsorption-based vapor recovery system that was previously proposed as BACT for VOC emissions from the product loading racks. This control option is technically feasible for the small day tanks because these tanks will be a part of the vapor balancing system used to control emissions from the product loading operation. The reduction in VOC emissions from storage tank withdrawal and standing losses will be comparable to what is achievable with the thermal oxidizer, as the total VOC emissions from the vapor recovery system will remain within the previously proposed BACT limit of 1.25 pounds per million gallons of product loaded, and there will be no combustion-related emissions.

As you suggested during our meeting in Pierre, for the remaining 89 tanks that are proposed to be equipped with an internal floating roof design, we have further evaluated the thermal oxidizer control option and we have again concluded that this option does not represent BACT. You mentioned that one of DENR's considerations in making its BACT determination is the fact that another facility, the Arizona Clean Fuels Yuma refinery, is required by its PSD permit to employ the control option being considered here. As I mentioned in our meeting, the permit for the Arizona facility expired in March 2008 because the project proponent was unable to commence construction within the required 18-month time period. Therefore, there is absolutely no precedent for the control option under consideration here. In fact, as mentioned in our permit application, U.S. EPA has never even identified and considered this control option in establishing Maximum Achievable Control Technology standards for storage vessels, and those standards are required by the Clean Air Act to represent the maximum degree of emission reductions achievable by a particular category of source. Notably, we are unaware of any organic liquid storage tank, even in the Houston/Galveston and Los Angeles ozone nonattainment areas, equipped with the VOC emission controls being considered here. For these qualitative reasons, as well as the quantitative reasons discussed below, we consider it inappropriate to require the use of a thermal oxidizer for the storage tanks at the HEC.

In Section 4.7.1.5.2 and in Appendix D to the permit application, for the control option that would include a closed vent system routed to a thermal oxidizer, we estimated that the capital cost of this control option as applied to all 104 tanks would be approximately $32 million and the annualized cost would be $3.7 million. The achievable VOC emission reduction was estimated to be 231 tons per year, including 90.7 tons per year from controlling the emissions from the vacuum residuum storage tanks. Based on these values, the cost effectiveness of this control option was estimated to be $16,000 per ton of VOC

emission reduction. These cost estimates were based on the use of a single, central thermal oxidizer system serving all of the affected tanks.

In further evaluating the feasibility of the thermal oxidizer control option for the 89 storage tanks proposed to be configured with an internal floating roof design, we have determined that the more practical and cost-effective means of applying this control option would involve installation of two separate thermal oxidizers, one serving the crude and intermediate tanks to the west of the main process area and one serving the product tanks to the south of the main process area. This configuration would greatly reduce the lengths of piping runs between affected tanks and the associated thermal oxidizer system. We estimate that the capital cost of this control option is $24.7 million and the annualized cost is $2.8 million. The achievable emission reduction is 98.1 tons per year and the cost effectiveness is $29,000 per ton of VOC emission reduction.

Recognizing that it is not economically feasible to control VOC emissions from all 89 of the remaining internal floating roof tanks using thermal oxidizers, as discussed above, we have also evaluated whether it would be economically feasible to apply this control option only for the 59 of these tanks that are most economically controlled. (This includes 57 of the 58 tanks that store organic liquids with vapor pressures in excess of 0.01 psia, plus the rich amine tank and the amine swing tank. The methanol tank is excluded due to its geographic separation from the remaining tanks.) As above, our cost estimates for this control option are based on the use of two thermal oxidizers serving tanks in two distinct areas. Our estimate for these tanks is a capital cost of $18.5 million and an annualized cost of $2.1 million. The achievable emission reduction is 92.0 tons per year and the cost effectiveness is $23,000 per ton of VOC emission reduction.

Finally, as you mentioned during our meeting, our estimates of emissions from internal floating roof storage tanks, and as a result our estimates of the emission reductions achievable with a thermal oxidizer and the cost effectiveness of achieving those reductions, are based on the assumption that each affected tank will store a particular material with an assumed maximum vapor pressure. Notwithstanding the need for operational flexibility in the refinery's storage tanks, we consider these assumptions to be appropriate. The economic impacts analysis is being performed not for individual tanks, on which basis the controls would certainly be economically prohibitive, but for collections of several storage tanks. The assumptions regarding stored liquids, vapor pressures, and product mix are fairly characterized as "standard industry practice." In other words, these assumptions represent the inherent design of the refinery, which will produce diesel fuel and jet fuel as well as gasoline; it would be unrealistic to assume that all tanks at the refinery would store gasoline or gasoline blending components, and it would be equally unrealistic to assume that diesel and jet fuel would have a vapor pressure in excess of 0.01 psia. It is normal and customary to assume these types of "standard industry practice" parameters in making BACT determinations, even where those assumptions are not enforceable with respect to a particular emissions unit. See, for example, Section IV.D.2.b of the October 1990 draft NSR Workshop Manual.

Thank you for your attention to this matter.

Colin Campbell

File: XXXX_Sum
REVISION NO. 0
Estimate No. 1A
CLIENT: Hyperion
LOCATION: Elk Point, SD
PLANT: Hyperion Energy Center
JOB NO.: 14912
DATE: August 2008

MUSTANG ENGINEERS & CONSTRUCTORS, LP.
CONFIDENTIAL PROJECT SUMMARY
DO NOT REPRODUCE-INHOUSE COPY ONLY
Rough Order of Magnitude Estimate
ACCURACY RANGE: +/- 50%

Tank Farm Vapor Recovery (Incineration)
(Lighter Than Jet Confinguration)

EST. BY: MDA

27-Aug-08
11:32 AM

	DIRECT COST	TA HOURS	PTA HOURS	LABOR DOLLARS	MATL DOLLARS	S/C DOLLARS	TOTALS
1	INCINERATION SYSTEM				$7,150,000		$7,150,000
2	SITEWORK						
3	EARTHWORK						
4	PILING						
5	CONCRETE						
6	STRUCT. STEEL						
7	BUILDINGS						
8	ABOVEGROUND PIPE				$7,321,000		$7,321,000
9	UNDERGROUND PIPE						
10	INSTRUMENTS				$1,500,000		$1,500,000
11	ELECTRICAL				$1,500,000		$1,500,000
12	INSULATION						
13	PAINTING						
14	FIREPROOFING						
15	DEMOLITION						
16	SUPPORT WORK						
17	TOTAL DIRECTS				$17,471,000		$17,471,000
18	INDIRECT MATL/LBR/S/C						
19	INDIRECT LABOR / TRAVEL & SUB						
20	FIELD STAFF / HOME OFFICE COST						
21	CONSTRUCTION EQUIPMENT						
22	MARKUP & FIXED FEE						
23	TOTAL INDIRECTS						
24	SUBTOTAL (17 & 23)						$17,471,000
25							
26							
27							
28							
29							
30	TOTAL HOME OFFICE						
31	SUBTOTAL (24 & 30)						$17,471,000
32							
33	SALES TAX						
34	ESCALATION						
35	CONTINGENCY						
36							
37							
38							
39	TOTAL INSTALLED COSTS (31 thru 38)						$17,471,000
40	CLIENT COSTS	5%					$1,000,000
41							
42	TOTAL JOB COSTS						$18,471,000

File: XXXX_Sum	**MUSTANG ENGINEERS & CONSTRUCTORS, LP.**	PAGE 1 OF 1
REVISION NO. 0	CONFIDENTIAL PROJECT SUMMARY	EST. BY: MDA
Estimate No. 1A	DO NOT REPRODUCE-INHOUSE COPY ONLY	
CLIENT: Hyperion	**Rough Order of Magnitude Estimate**	
LOCATION: Elk Point, SD	ACCURACY RANGE: +/- 50%	
PLANT: Hyperion Energy Center		
JOB NO.: 14912	**Tank Farm Vapor Recovery (Incineration)**	
DATE: August 2008	Details	27-Aug-08
	Compression System	11:32 AM

Item	Cost	Qty				
West Tank Farm Incinerator - 5300 ACFM all relevant Tanks Recovered						
Equipment	600000	1				$ 600,000
Total						**$ 3,900,000**
South Tank Farm Incinerator - 1200 ACFM - all relevant Tanks Recovered						
Equipment	400000	1				$ 400,000
Total						**$ 2,600,000**
Sub Total						**$ 6,500,000**
Escalation to 2008					10%	$ 650,000
Total						**$ 7,150,000**

File: XXXX_Sum	**MUSTANG ENGINEERS & CONSTRUCTORS, LP.**	PAGE 1 OF 1
REVISION NO. 0	CONFIDENTIAL PROJECT SUMMARY	EST. BY: MDA
Estimate No. 1A	DO NOT REPRODUCE-INHOUSE COPY ONLY	
CLIENT: Hyperion	**Rough Order of Magnitude Estimate**	
LOCATION: Elk Point, SD	ACCURACY RANGE: +/- 50%	
PLANT: Hyperion Energy Center		
JOB NO.: 14912	**Tank Farm Vapor Recovery (Incineration)**	
DATE: August 2008	Details	27-Aug-08
	Piping Systems	11:32 AM

Item	Count	Qty/Item			Unit Cost	
West Tank Farm						
Vapor Lines						
Tank Count	41	200			250	$ 2,050,000
Headers	1	6000			350	$ 2,100,000
Sweep Gas Lines	18	200			150	$ 540,000
Total West Tank Farm						**$ 4,690,000**
South Tank Farm						
Vapor Lines						
Tank Count	18	200			250	$ 900,000
Headers	1	1500			350	$ 525,000
Sweep Gas Lines	18	200			150	$ 540,000
Total South Tank Farm						**$ 1,965,000**
Sub Total						$ 6,655,000
Escalation to 2008					10%	$ 665,500
Total						**$ 7,321,000**

File: XXXX_Sum
REVISION NO. 0
Estimate No. 1B
CLIENT: Hyperion
LOCATION: Elk Point, SD
PLANT: Hyperion Energy Center
JOB NO.: 14912
DATE: August 2008

MUSTANG ENGINEERS & CONSTRUCTORS, LP.
CONFIDENTIAL PROJECT SUMMARY
DO NOT REPRODUCE-INHOUSE COPY ONLY
Rough Order of Magnitude Estimate
ACCURACY RANGE: +/- 50%

Tank Farm Vapor Recovery (Incineration)
(All Tank Configuration)

EST. BY: MDA
08-Sep-08
4:12 PM

	DIRECT COST	TA HOURS	PTA HOURS	LABOR DOLLARS	MATL DOLLARS	S/C DOLLARS	TOTALS
1	INCINERATION SYSTEM				$7,865,000		$7,865,000
2	SITEWORK						
3	EARTHWORK						
4	PILING						
5	CONCRETE						
6	STRUCT. STEEL						
7	BUILDINGS						
8	ABOVEGROUND PIPE				$11,875,000		$11,875,000
9	UNDERGROUND PIPE						
10	INSTRUMENTS				$2,000,000		$2,000,000
11	ELECTRICAL				$2,000,000		$2,000,000
12	INSULATION						
13	PAINTING						
14	FIREPROOFING						
15	DEMOLITION						
16	SUPPORT WORK						
17	TOTAL DIRECTS				$23,740,000		$23,740,000
18	INDIRECT MATL/LBR/S/C						
19	INDIRECT LABOR / TRAVEL & SUB						
20	FIELD STAFF / HOME OFFICE COST						
21	CONSTRUCTION EQUIPMENT						
22	MARKUP & FIXED FEE						
23	TOTAL INDIRECTS						
24	SUBTOTAL (17 & 23)						$23,740,000
25							
26							
27							
28							
29							
30	TOTAL HOME OFFICE						
31	SUBTOTAL (24 & 30)						$23,740,000
32							
33	SALES TAX						
34	ESCALATION						
35	CONTINGENCY						
36							
37							
38							
39	TOTAL INSTALLED COSTS (31 thru 38)						$23,740,000
40	CLIENT COSTS	5%					$1,000,000
41							
42	TOTAL JOB COSTS						$24,740,000

File: XXXX_Sum	**MUSTANG ENGINEERS & CONSTRUCTORS, LP.**	PAGE 1 OF 1
REVISION NO. 0	CONFIDENTIAL PROJECT SUMMARY	EST. BY: MDA
Estimate No. 1B	DO NOT REPRODUCE-INHOUSE COPY ONLY	
CLIENT: Hyperion	**Rough Order of Magnitude Estimate**	
LOCATION: Elk Point, SD	ACCURACY RANGE: +/- 50%	
PLANT: Hyperion Energy Center		
JOB NO.: 14912	**Tank Farm Vapor Recovery (Incineration)**	
DATE: August 2008	Details	08-Sep-08
		4:12 PM

Item	Cost	Qty				
West Tank Farm Incinerator - 7,200 ACFM all relevant Tanks Recovered						
Equipment	650000	1				$ 650,000
Total						**$ 4,225,000**
South Tank Farm Incinerator - 2,200 ACFM - all relevant Tanks Recovered						
Equipment	450000	1				$ 450,000
Total						**$ 2,925,000**
Sub Total						**$ 7,150,000**
Escalation to 2008					10%	$ 715,000
Total						**$ 7,865,000**

File: XXXX_Sum	**MUSTANG ENGINEERS & CONSTRUCTORS, LP.**	PAGE 1 OF 1
REVISION NO. 0	CONFIDENTIAL PROJECT SUMMARY	EST. BY: MDA
Estimate No. 1B	DO NOT REPRODUCE-INHOUSE COPY ONLY	
CLIENT: Hyperion	**Rough Order of Magnitude Estimate**	
LOCATION: Elk Point, SD	ACCURACY RANGE: +/- 50%	
PLANT: Hyperion Energy Center		
JOB NO.: 14912	**Tank Farm Vapor Recovery (Incineration)**	
DATE: August 2008	Details	08-Sep-08
	Piping Systems	4:12 PM

Item	Count	Qty/Item			Unit Cost	
West Tank Farm						
Vapor Lines						
Tank Count	60	200			250	$ 3,000,000
Headers	1	8000			350	$ 2,800,000
Sweep Gas Lines	60	200			150	$ 1,800,000
Total West Tank Farm						**$ 7,600,000**
South Tank Farm						
Vapor Lines						
Tank Count	29	200			250	$ 1,450,000
Headers	1	2500			350	$ 875,000
Sweep Gas Lines	29	200			150	$ 870,000
Total South Tank Farm						**$ 3,195,000**
Sub Total						$ 10,795,000
Escalation to 2008					10%	$ 1,079,500
Total						**$ 11,875,000**